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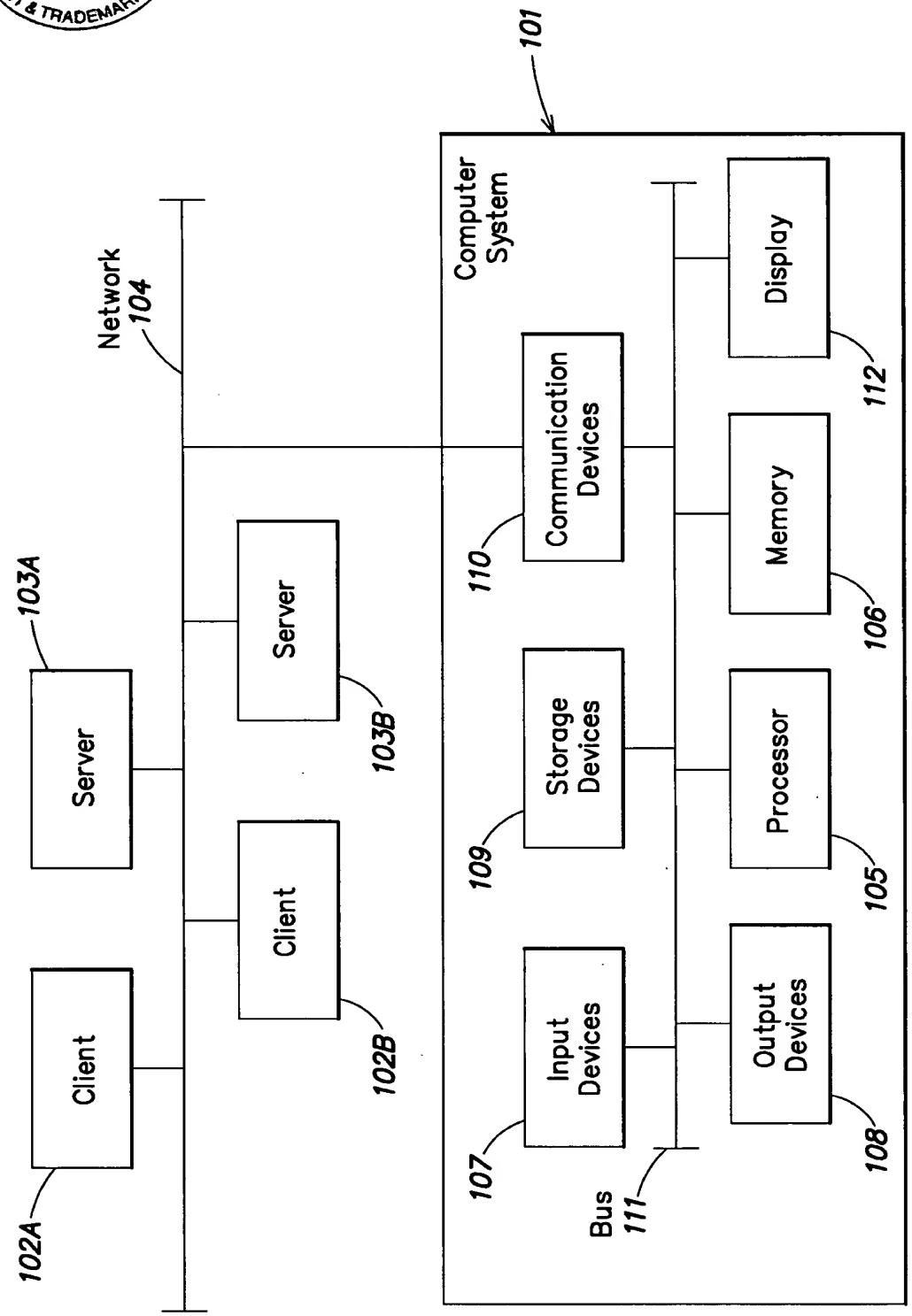

FIG. 1

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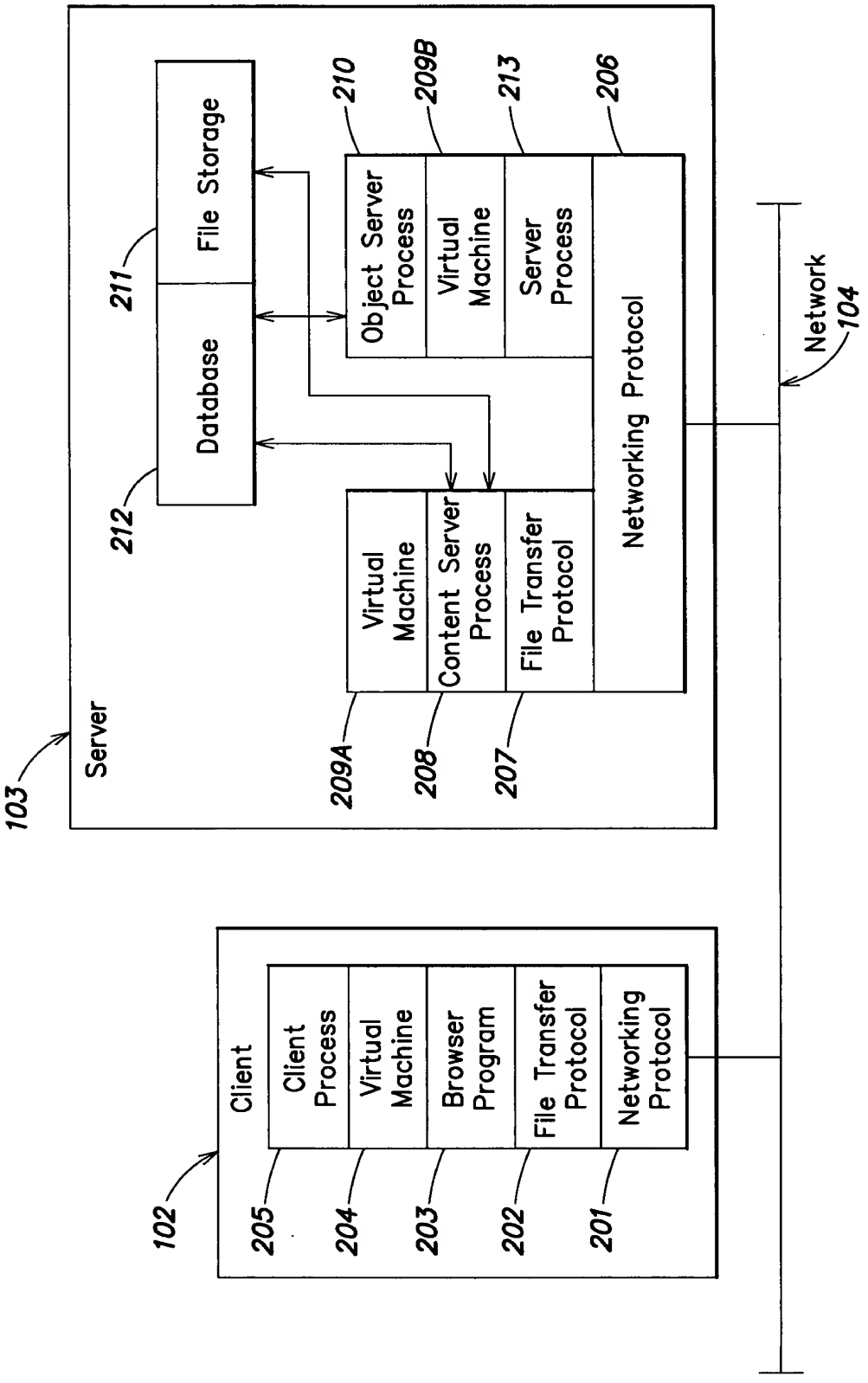

FIG. 2

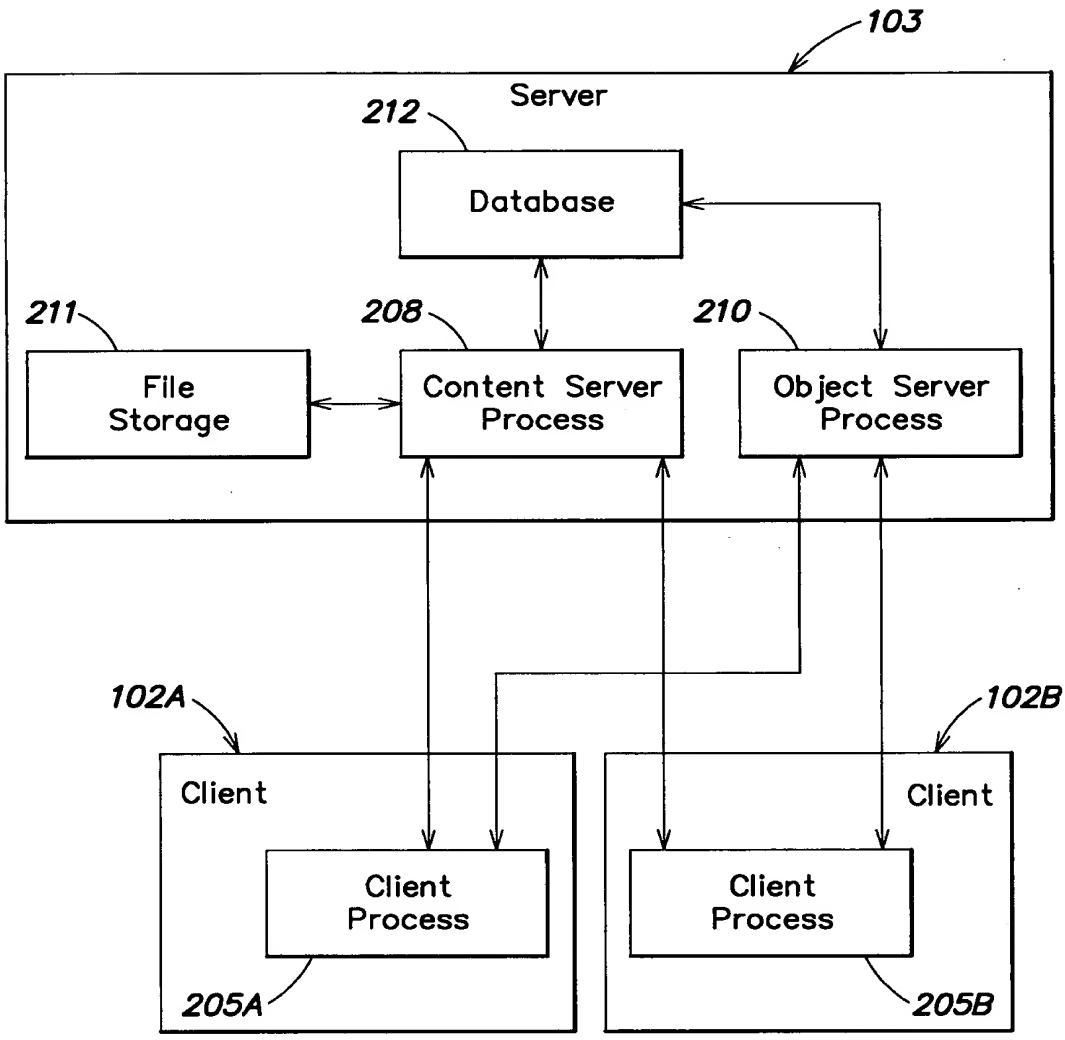
103
Server
212
Database
211
File Storage
208
Content Server Process
210
Object Server Process
102A
102B
Client
Client
Client Process
Client Process
205A
205B

FIG. 3A

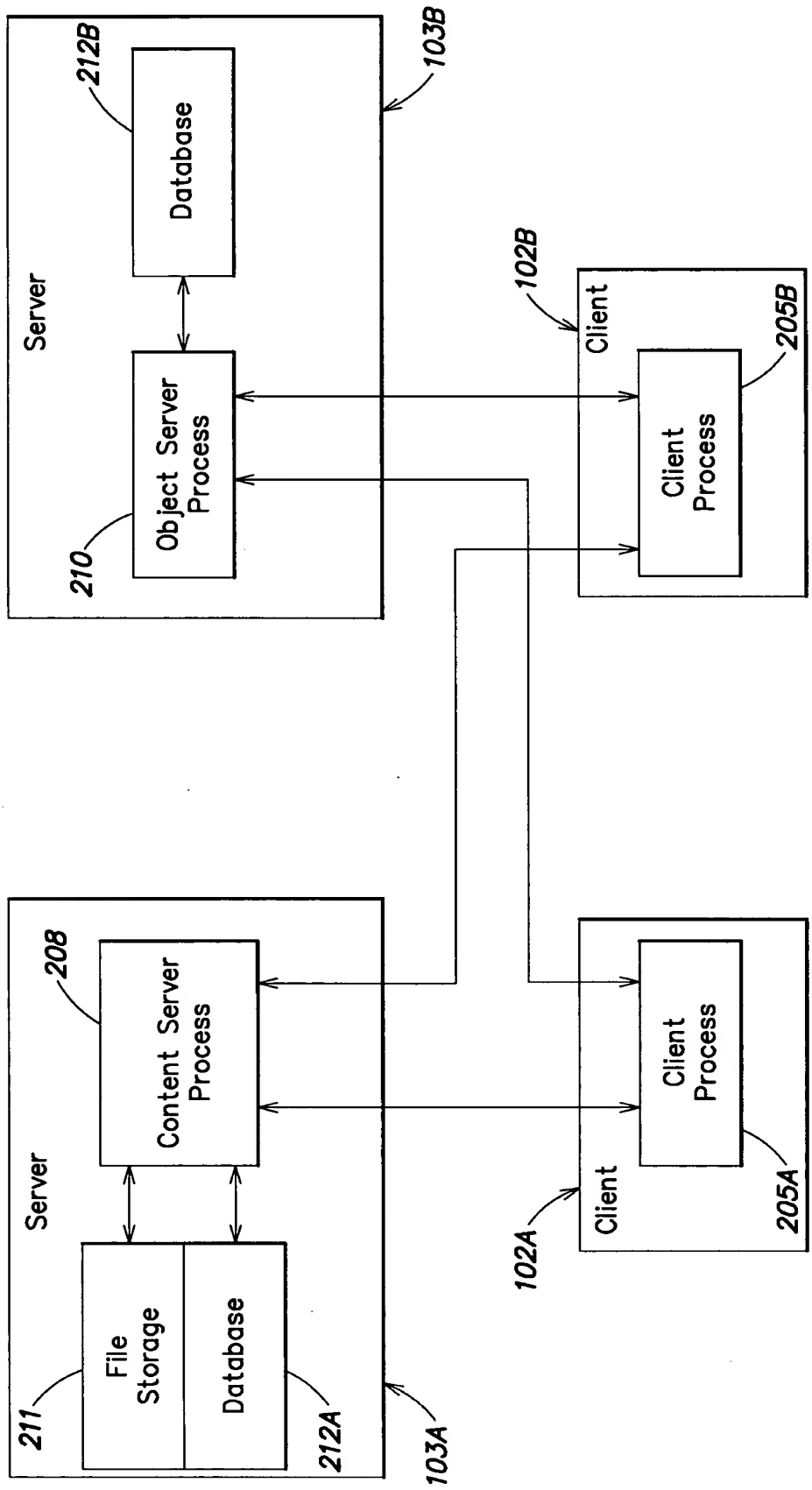
Server
212B
Database
103B
Object Server Process
210
Client
102B
205B
Client Process
Server
208
Content Server Process
File Storage
211
Database
212A
103A
Client
102A
205A
Client Process

FIG. 3B

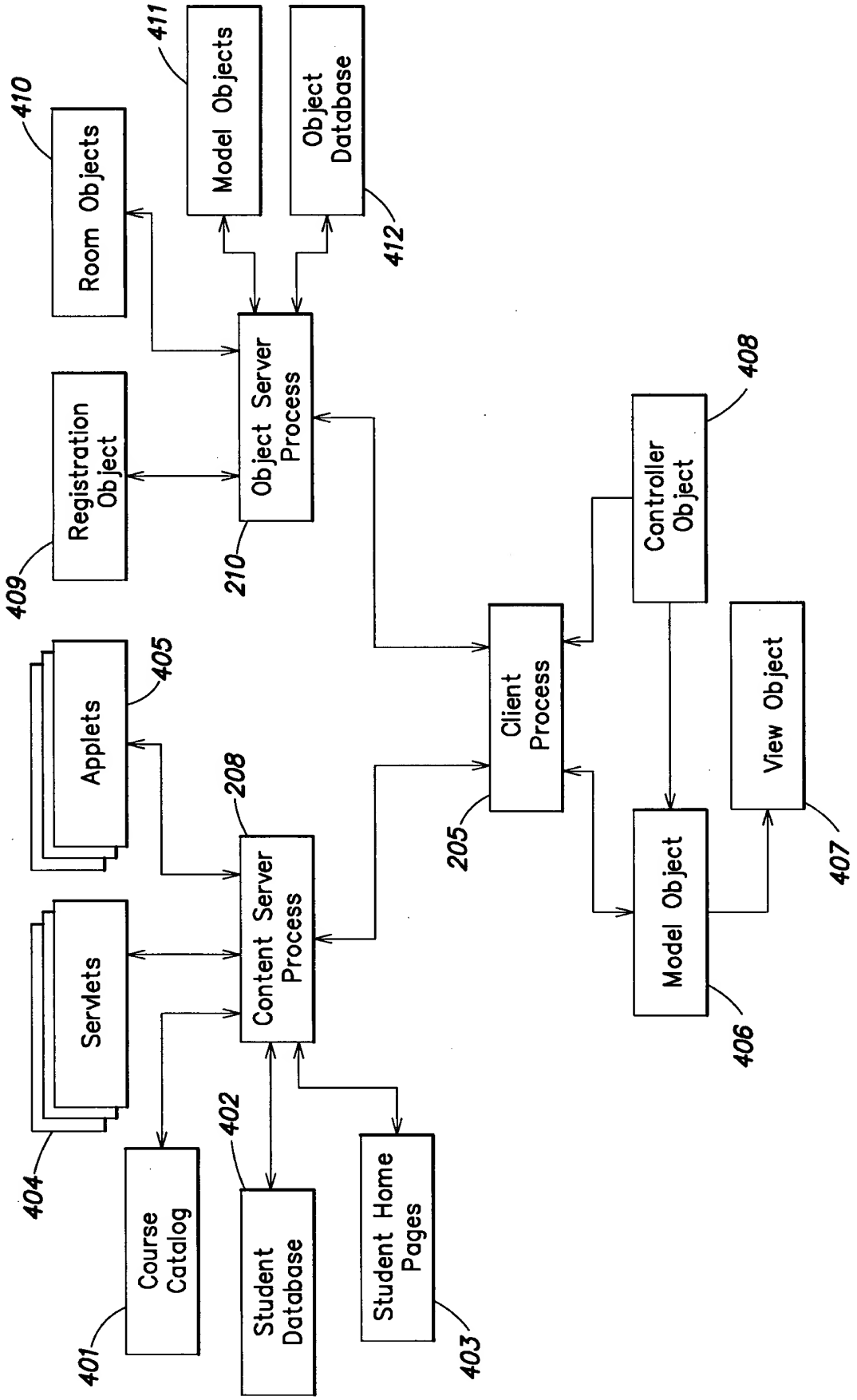
Room Objects
410
Model Objects
411
Object Database
412
Registration Object
409
Object Server Process
210
Controller Object
408
Applets
405
Client Process
205
View Object
407
Servlets
404
Content Server Process
208
Model Object
406
Course Catalog
401
Student Database
402
Student Home Pages
403

FIG. 4A

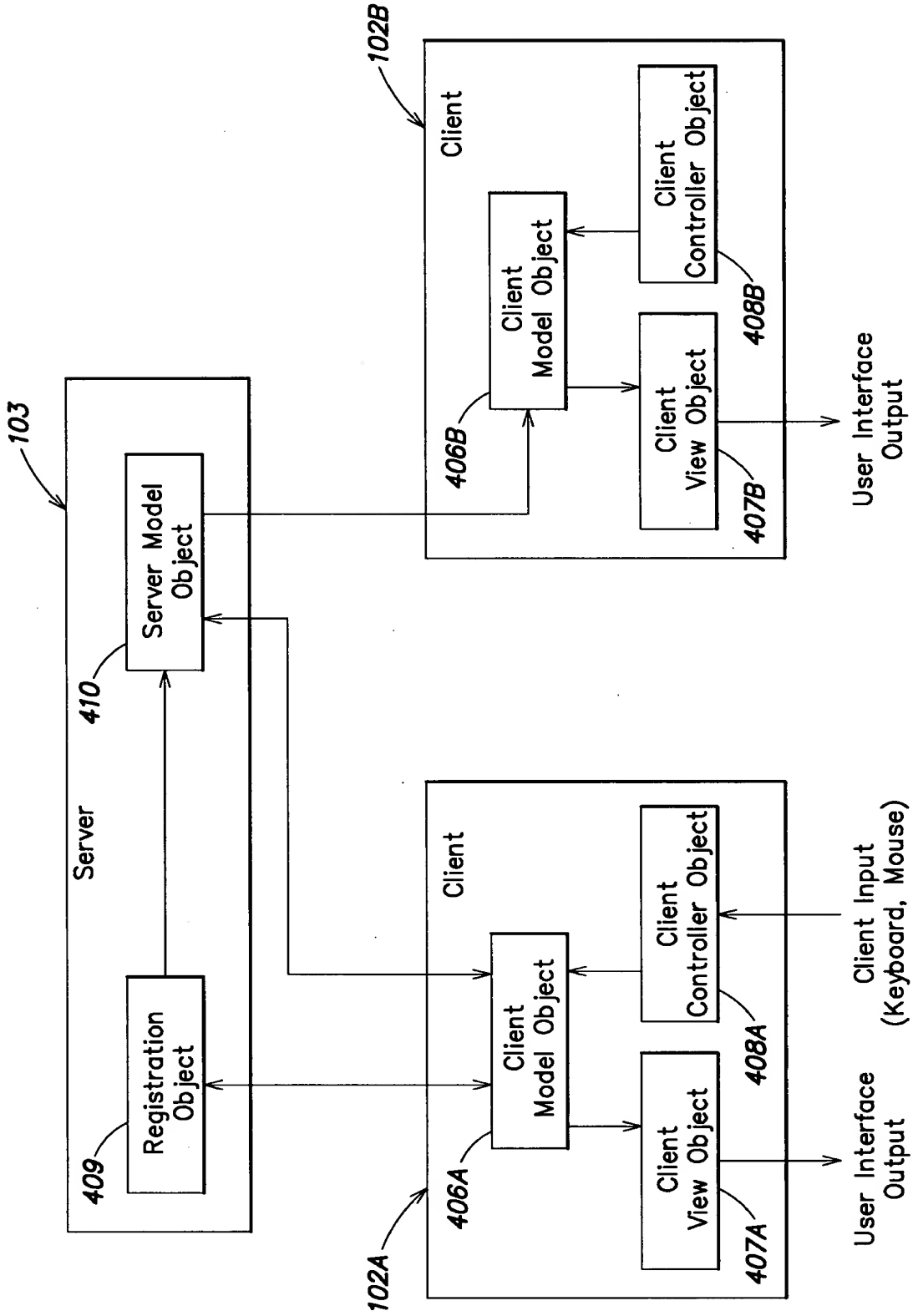
103
Server
Server Model Object
410
Registration Object
409
102B
Client
Client Model Object
406B
Client View Object
407B
Client Controller Object
408B
User Interface Output
102A
Client
Client Model Object
406A
Client View Object
407A
Client Controller Object
408A
Client Input (Keyboard, Mouse)
User Interface Output

FIG. 4B

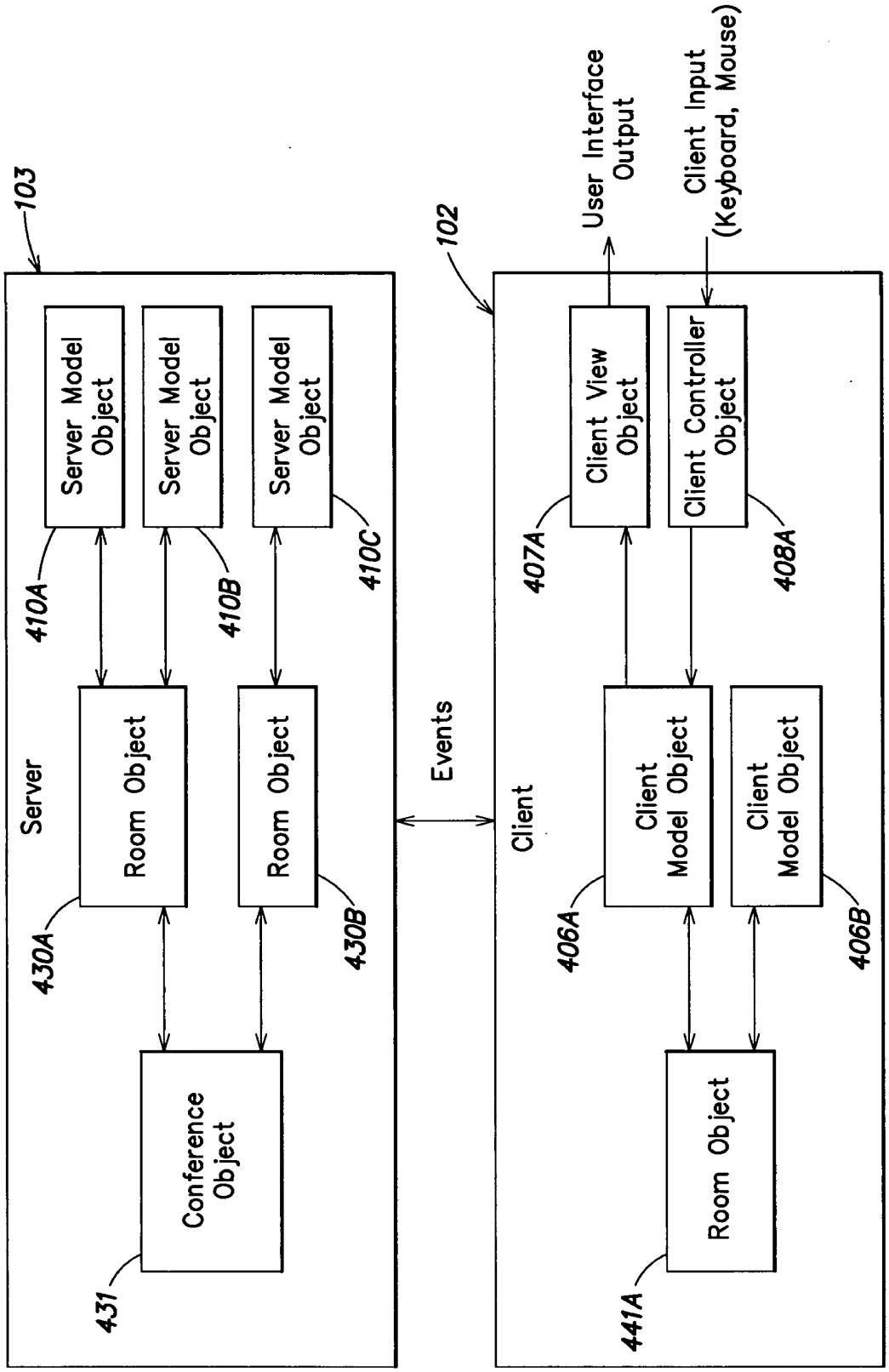
103
Server
Server Model Object
Server Model Object
Server Model Object
410A
410B
410C
Room Object
Room Object
430A
430B
Conference Object
431
Events
102
Client
User Interface Output
Client Input (Keyboard, Mouse)
Client View Object
Client Controller Object
407A
408A
Client Model Object
Client Model Object
406A
406B
Room Object
441A

FIG. 4C

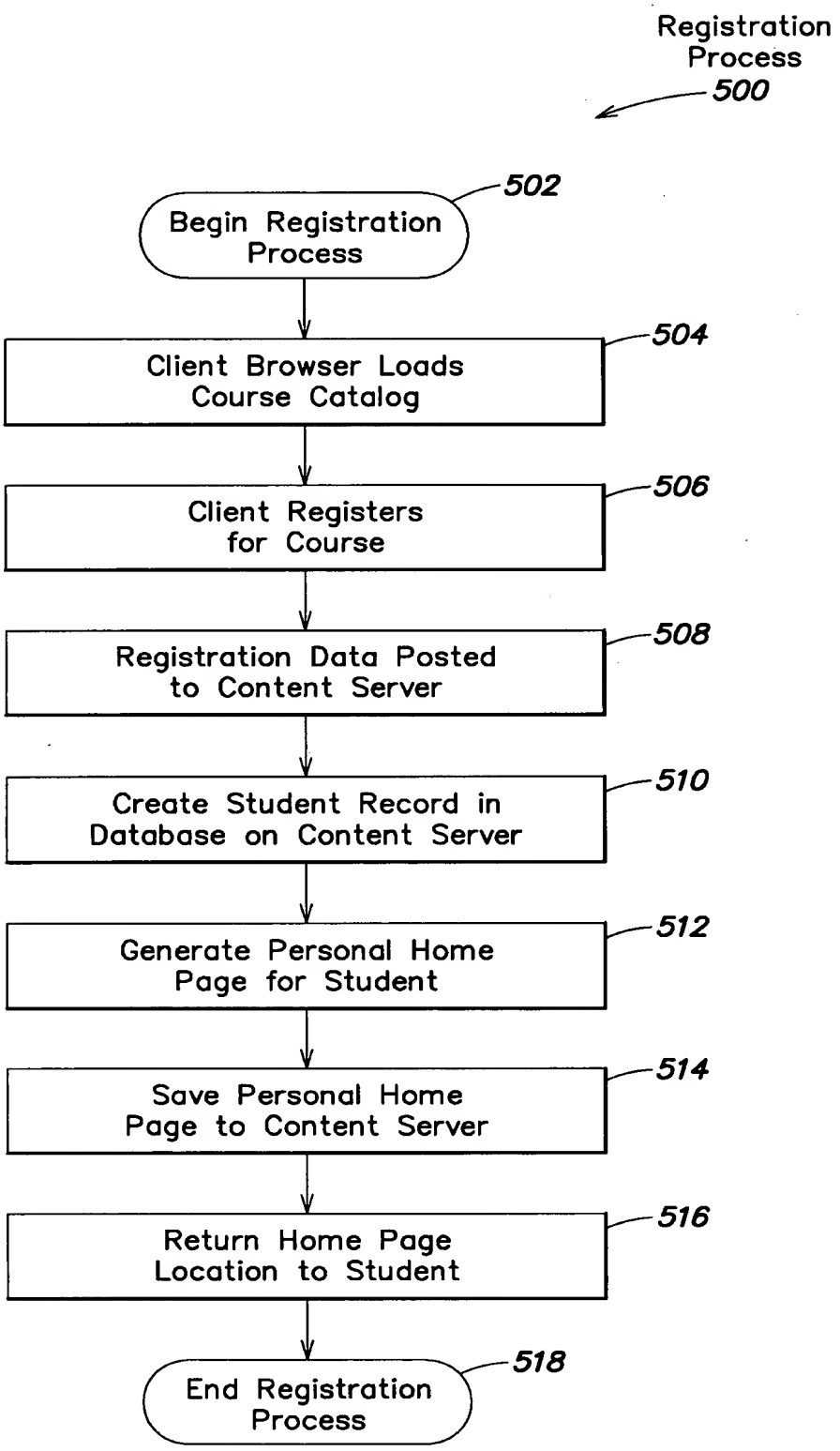
Registration Process
500
502
Begin Registration Process
504
Client Browser Loads Course Catalog
506
Client Registers for Course
508
Registration Data Posted to Content Server
510
Create Student Record in Database on Content Server
512
Generate Personal Home Page for Student
514
Save Personal Home Page to Content Server
516
Return Home Page Location to Student
518
End Registration Process

FIG. 5

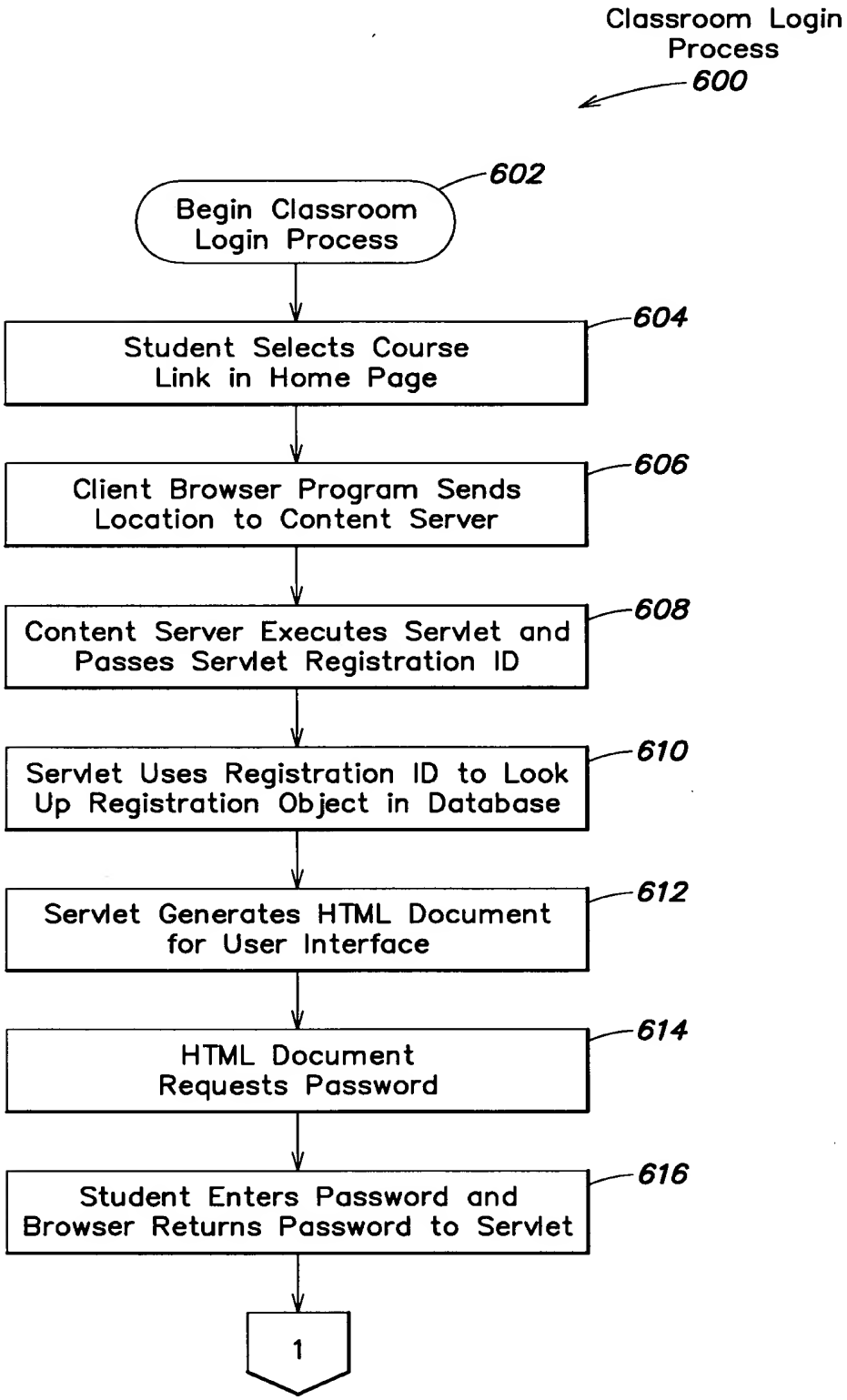
Classroom Login Process
600
602
Begin Classroom Login Process
604
Student Selects Course Link in Home Page
606
Client Browser Program Sends Location to Content Server
608
Content Server Executes Servlet and Passes Servlet Registration ID
610
Servlet Uses Registration ID to Look Up Registration Object in Database
612
Servlet Generates HTML Document for User Interface
614
HTML Document Requests Password
616
Student Enters Password and Browser Returns Password to Servlet
1

FIG. 6A

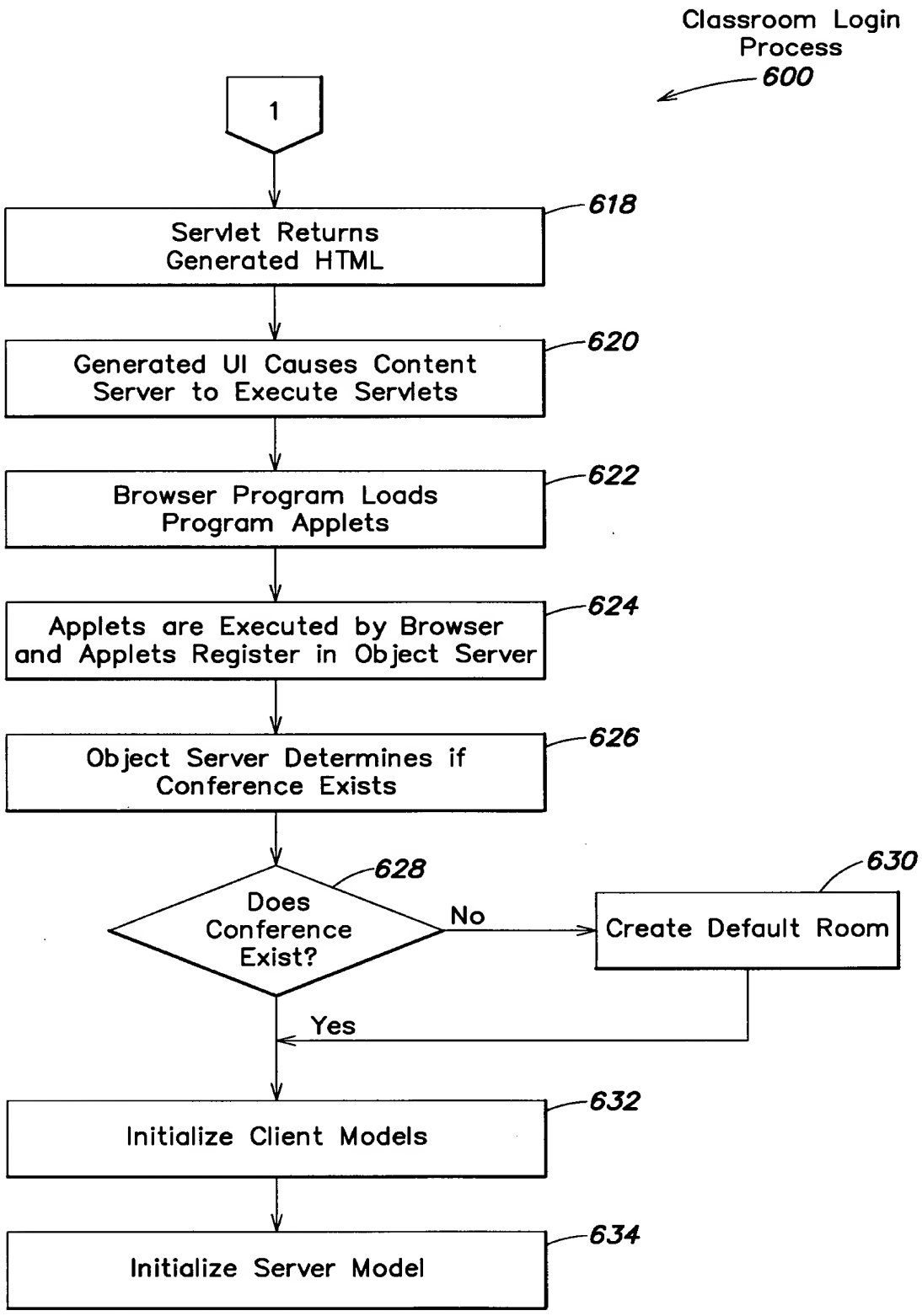
Classroom Login Process
600
1
Servlet Returns Generated HTML
618
Generated UI Causes Content Server to Execute Servlets
620
Browser Program Loads Program Applets
622
Applets are Executed by Browser and Applets Register in Object Server
624
Object Server Determines if Conference Exists
626
Does Conference Exist?
628
No
Create Default Room
630
Yes
Initialize Client Models
632
Initialize Server Model
634

FIG. 6B

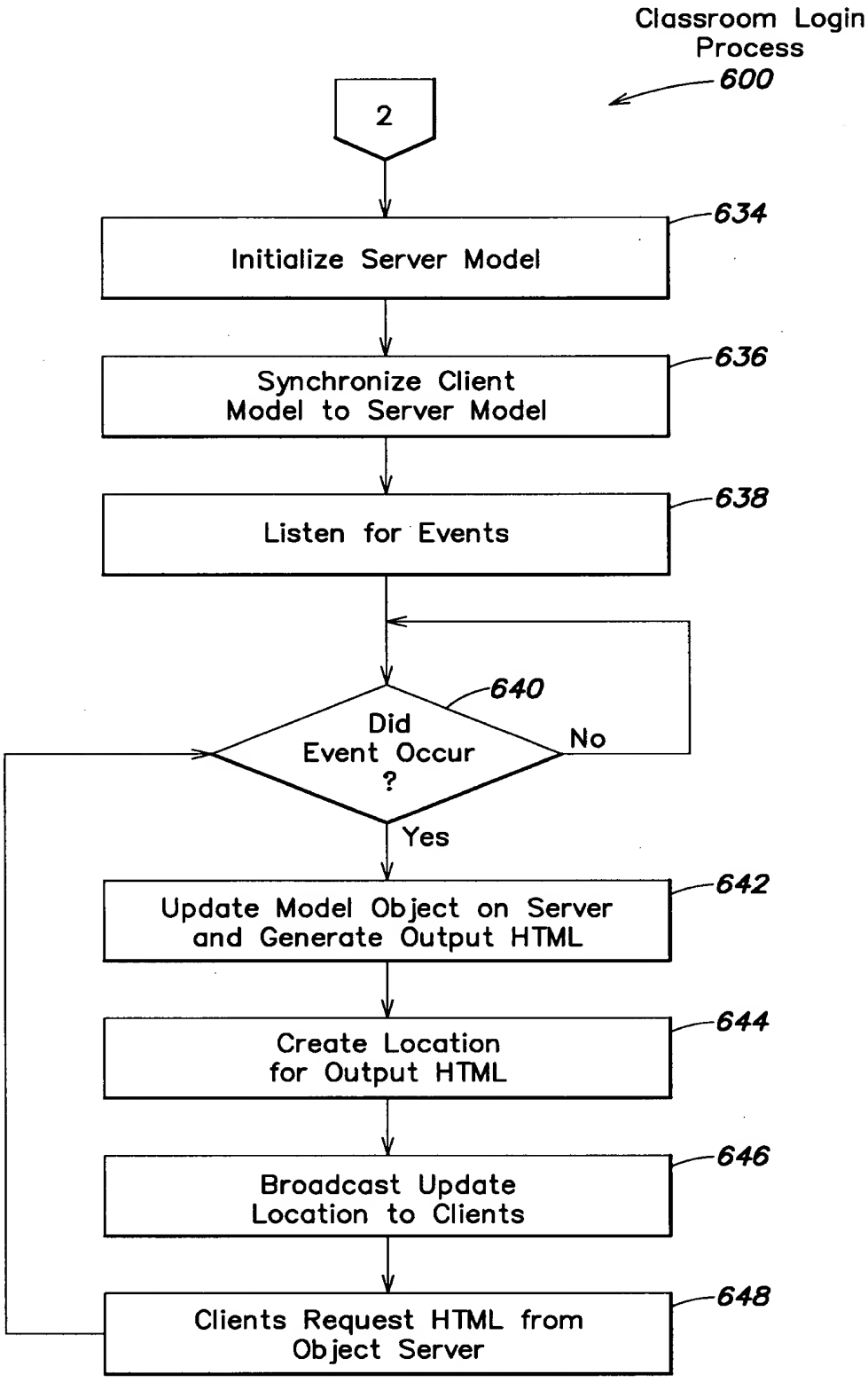
Classroom Login Process
600
2
634
Initialize Server Model
636
Synchronize Client Model to Server Model
638
Listen for Events
640
Did Event Occur ?
No
Yes
642
Update Model Object on Server and Generate Output HTML
644
Create Location for Output HTML
646
Broadcast Update Location to Clients
648
Clients Request HTML from Object Server

FIG. 6C

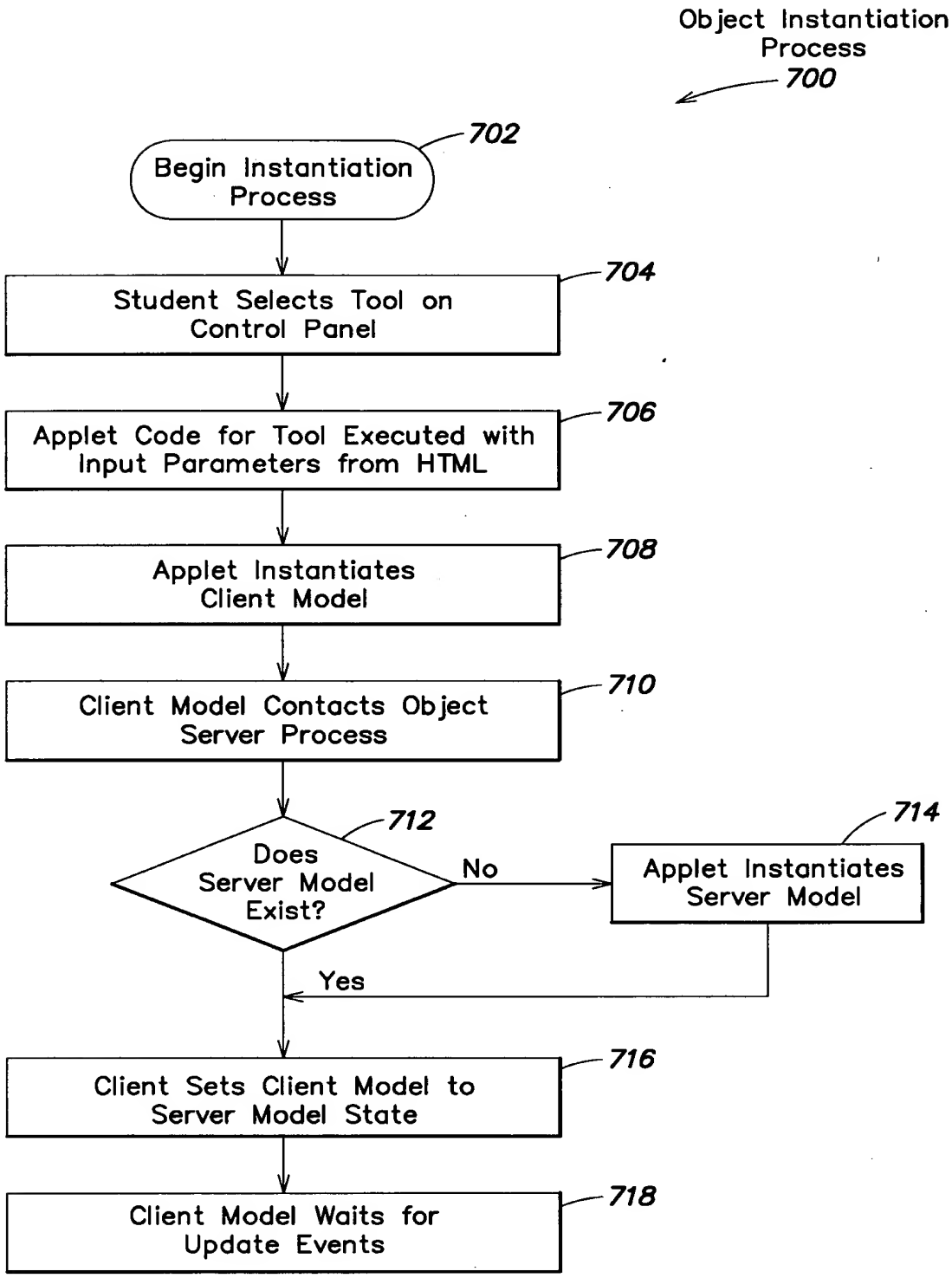
Object Instantiation Process
700
Begin Instantiation Process
702
Student Selects Tool on Control Panel
704
Applet Code for Tool Executed with Input Parameters from HTML
706
Applet Instantiates Client Model
708
Client Model Contacts Object Server Process
710
Does Server Model Exist?
712
No
Applet Instantiates Server Model
714
Yes
Client Sets Client Model to Server Model State
716
Client Model Waits for Update Events
718

FIG. 7

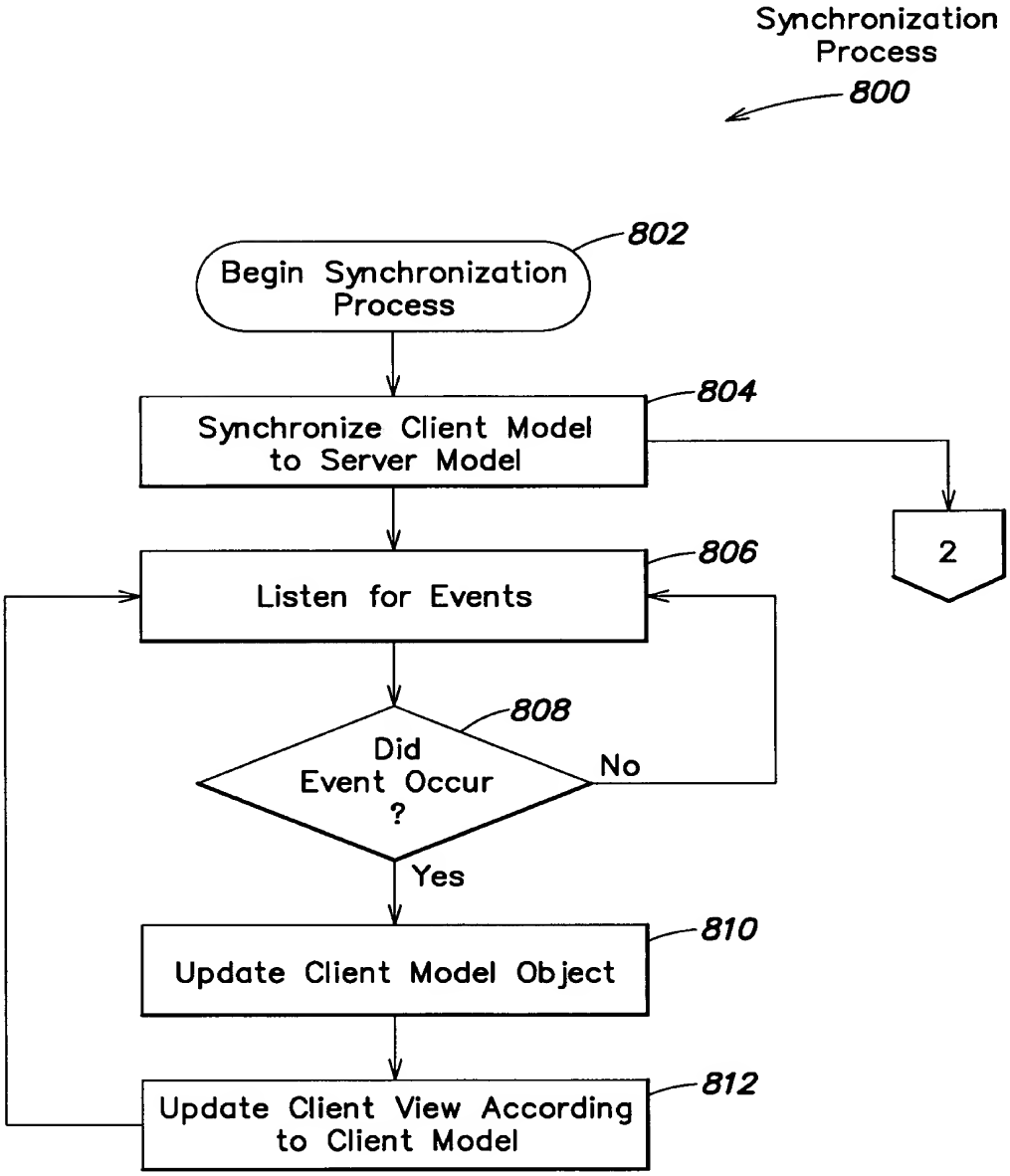
Synchronization Process
800
802
Begin Synchronization Process
804
Synchronize Client Model to Server Model
2
806
Listen for Events
808
Did Event Occur ?
No
Yes
810
Update Client Model Object
812
Update Client View According to Client Model

FIG. 8A

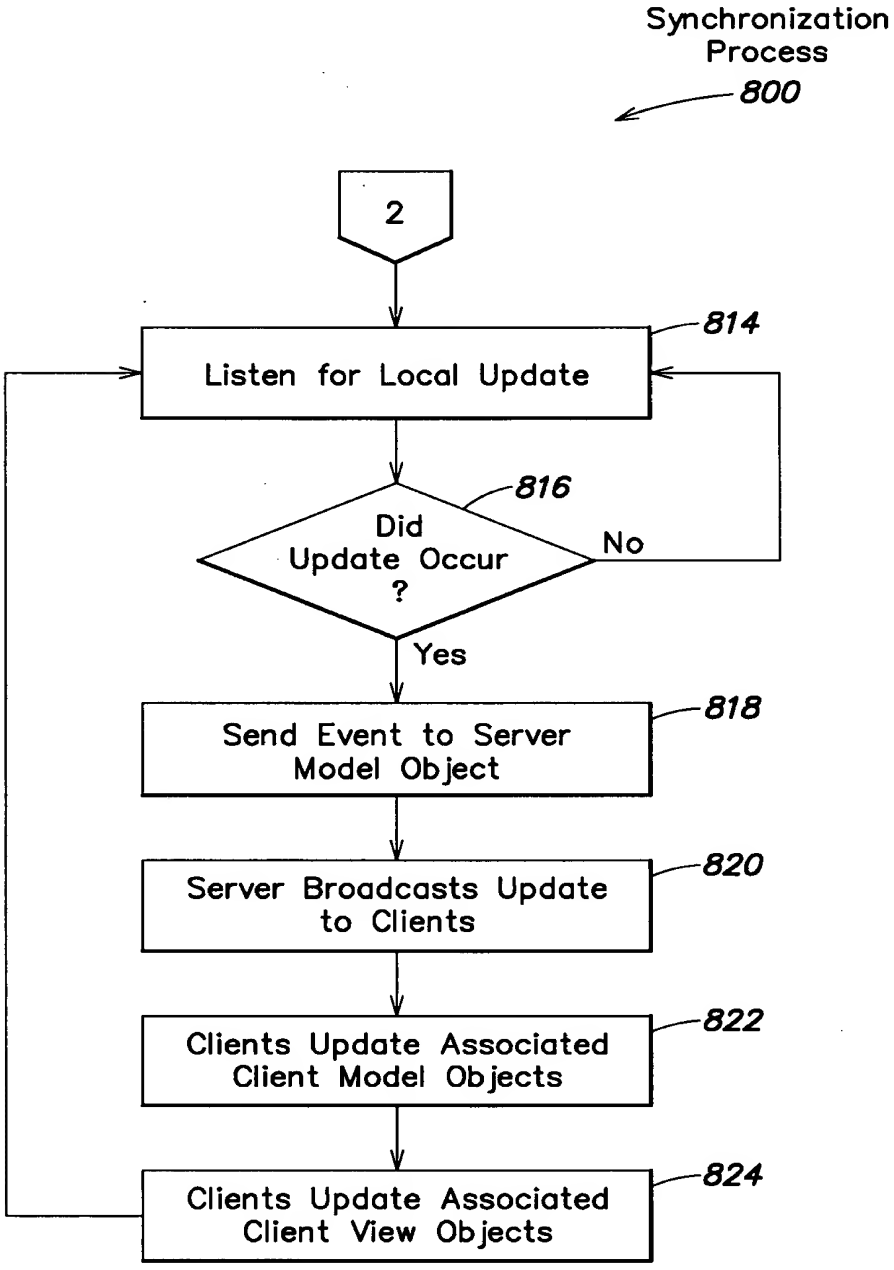
Synchronization Process
800
2
814
Listen for Local Update
816
Did Update Occur ?
No
Yes
818
Send Event to Server Model Object
820
Server Broadcasts Update to Clients
822
Clients Update Associated Client Model Objects
824
Clients Update Associated Client View Objects

FIG. 8B

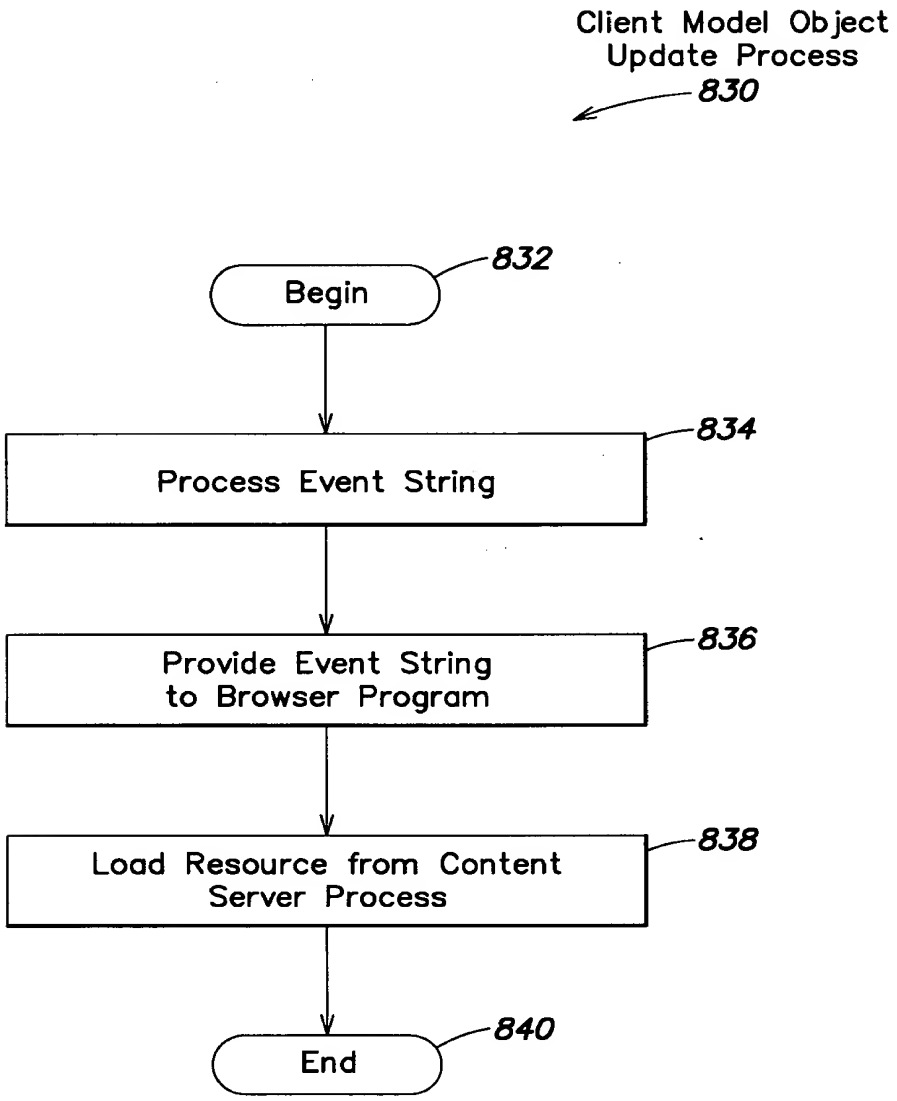
Client Model Object Update Process
830
Begin
832
Process Event String
834
Provide Event String to Browser Program
836
Load Resource from Content Server Process
838
End
840

FIG. 8C

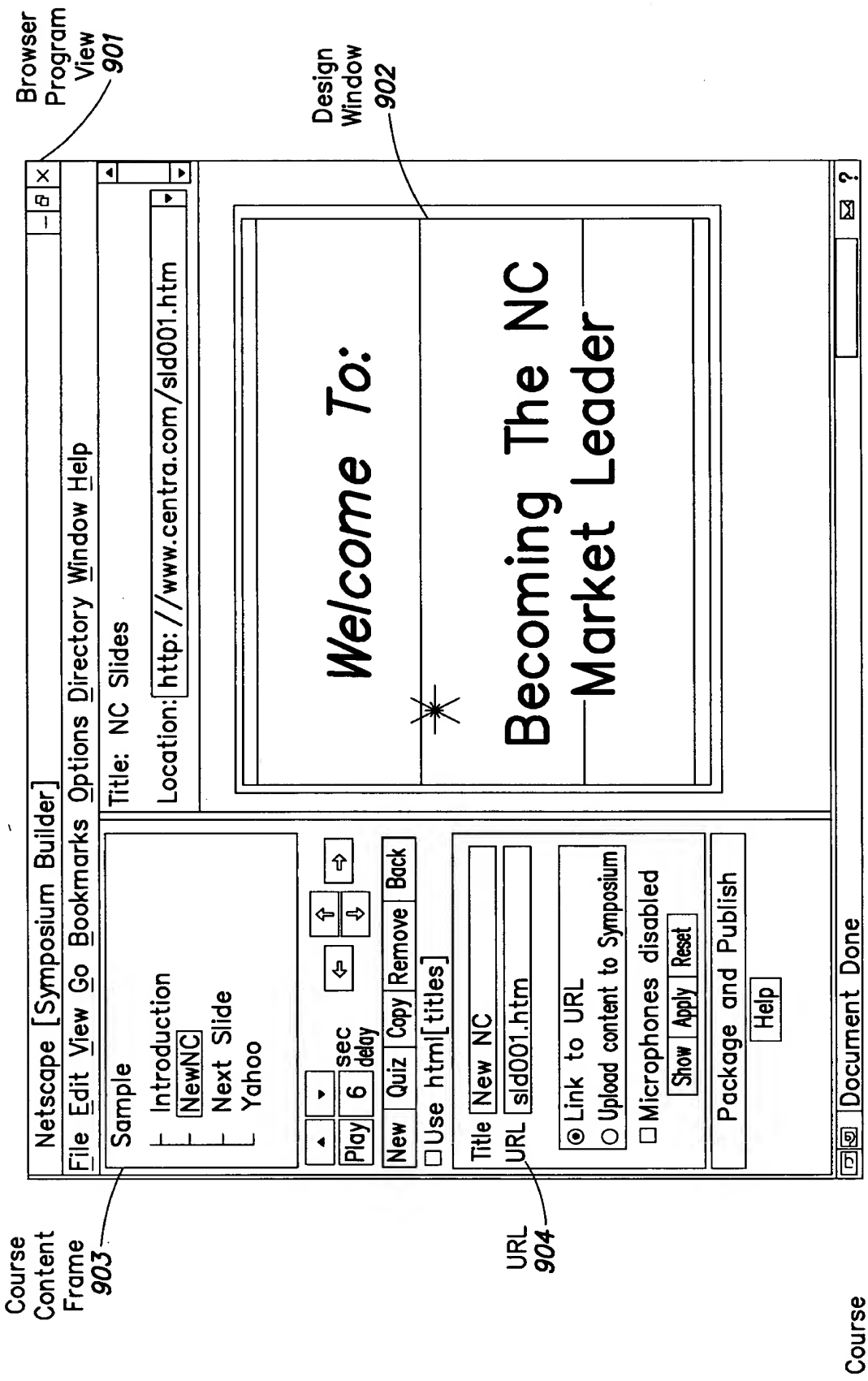
Browser Program View 901
Design Window 902
Course Content Frame 903
URL 904
Course Builder View 900
Netscape [Symposium Builder]
File Edit View Go Bookmarks Options Directory Window Help
Title: NC Slides
Location: http://www.centra.com/sld001.htm
Sample
Introduction
NewNC
Next Slide
Yahoo
Play 6 sec delay
New Quiz Copy Remove Back
Use html[titles]
Title New NC
URL sld001.htm
Link to URL
Upload content to Symposium
Microphones disabled
Show Apply Reset
Package and Publish
Help
Document Done
Welcome To:
Becoming The NC Market Leader

FIG. 9A

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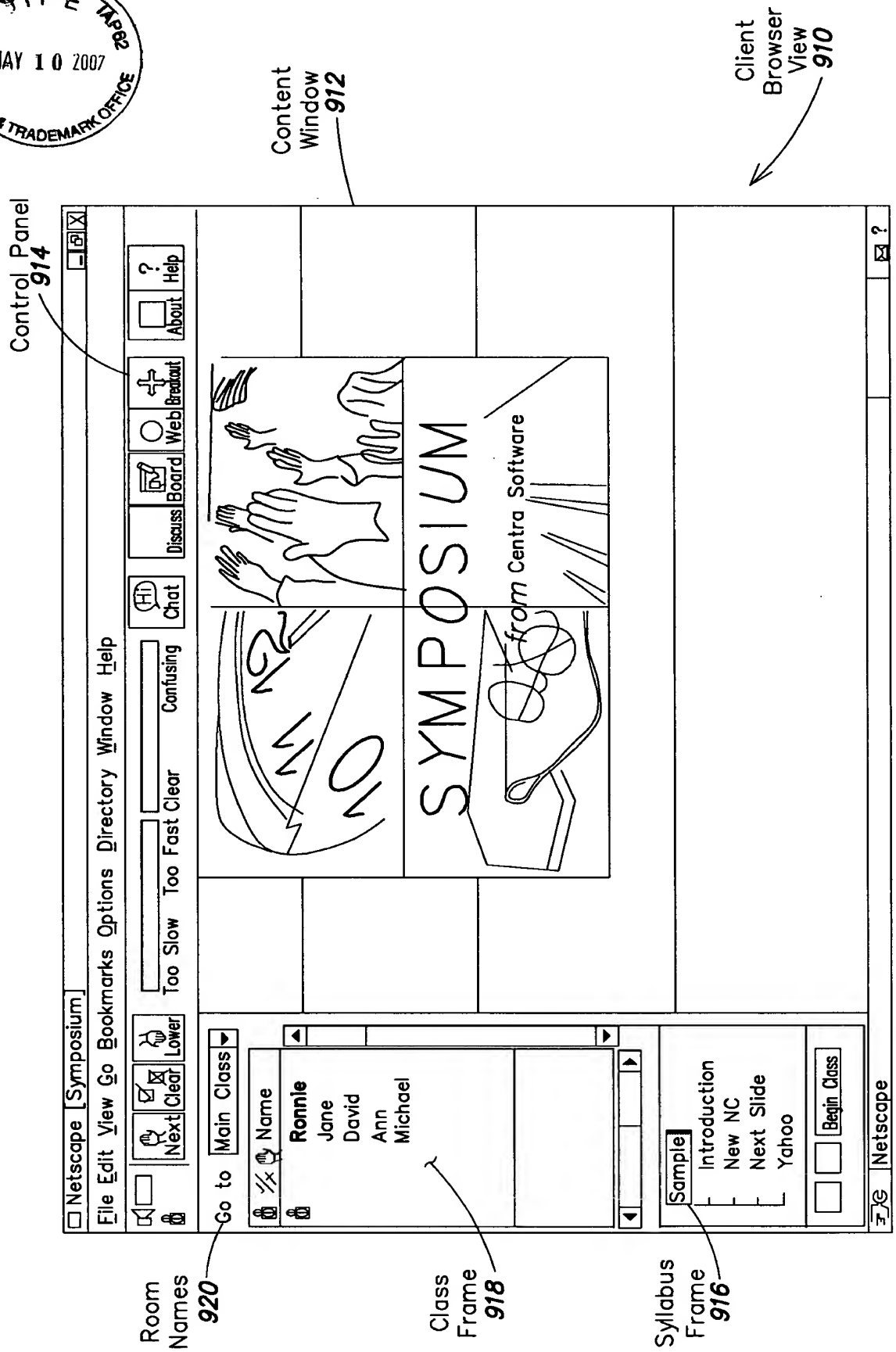

FIG. 9B